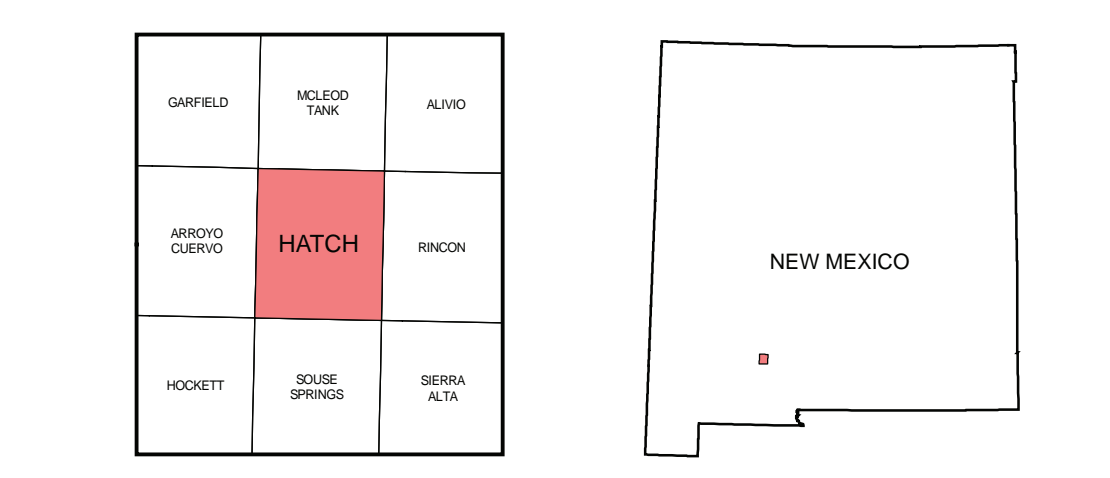


Base map from U.S. Geological Survey 1976, from photographs taken 1965, field checked in 1970, edited in 1993. 1997 North American Datum, UTM projection - zone 12N. 100-meter Universal Transverse Mercator grid, color 15, shown in blue.



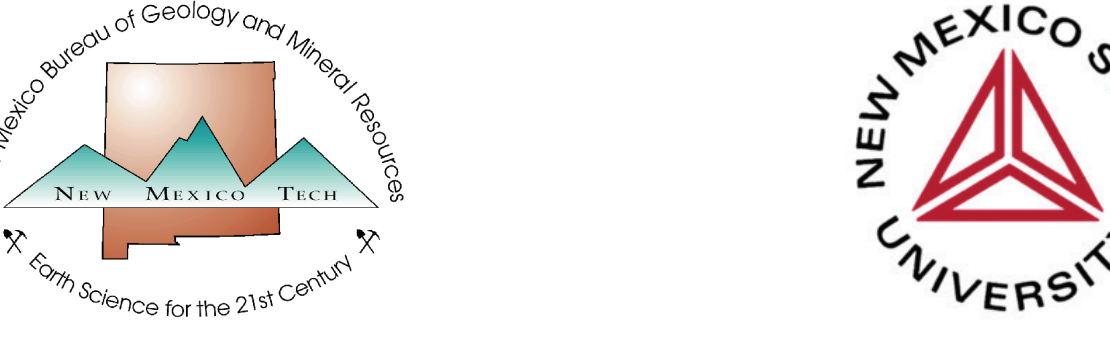
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Geologic Map of the Hatch 7.5-Minute Quadrangle, Doña Ana County, New Mexico

May 1995

by William R. Seager, John W. Hawley, G. H. Mack

This and other STATEMAP quadrangles are available for free download in both PDF and ArcGIS formats at <http://geoinfo.nmt.edu>

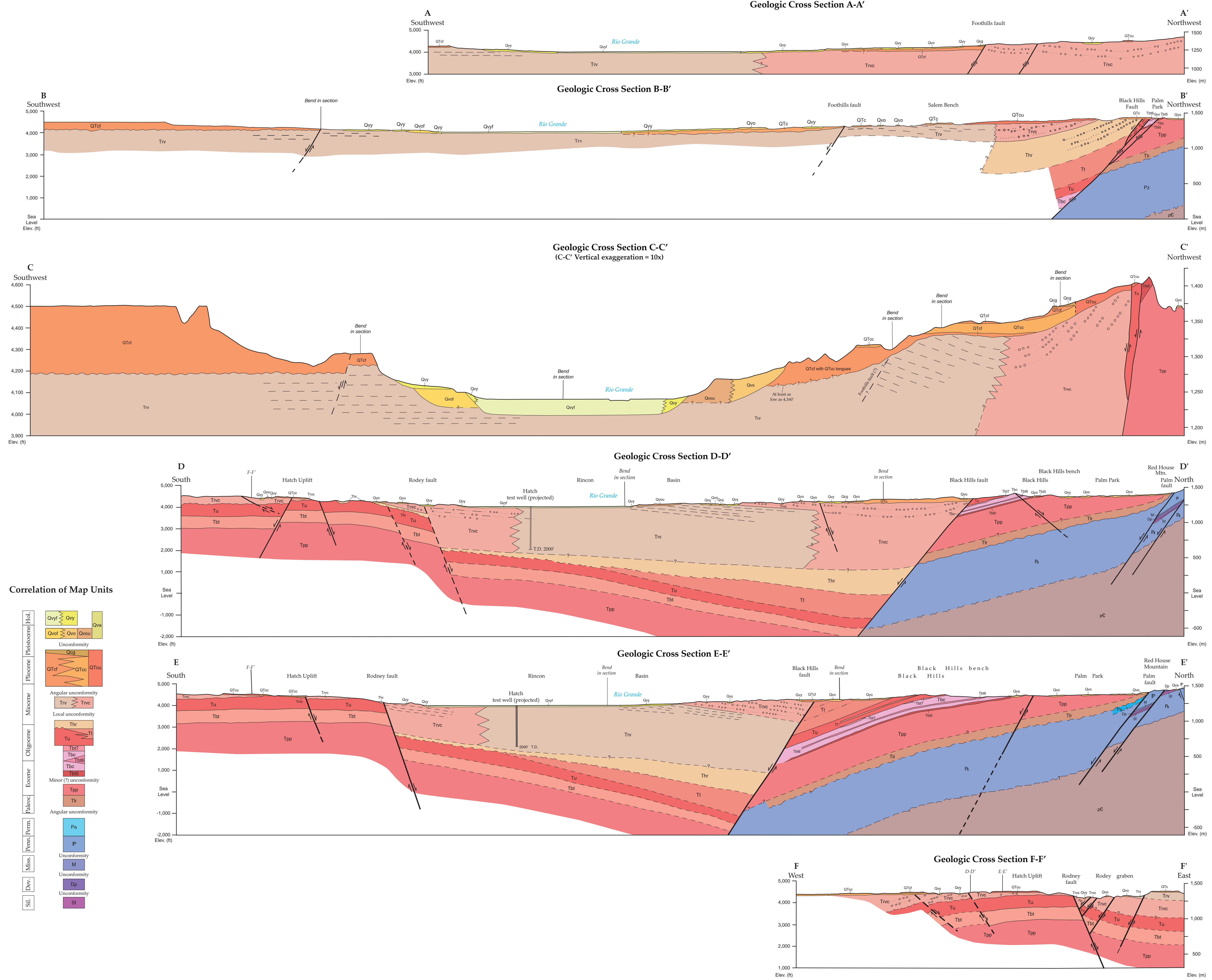


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- Quaternary**
- Qyf** Younger, valley-fill alluvium—Arroyo, fan, and terrace deposits (from boulder gravel to silt-clay), associated with surfaces graded to or within a few feet of the modern Rio Grande floodplain. As much as 40ft (12m) thick.
 - Qyf** Younger valley-fill, fluvial facies—Rio Grande floodplain and channel deposits (mostly gravel, sand, and clay); as much as 70ft (21m) thick.
 - Qvo** Older valley-fill alluvium—Arroyo, fan, terrace deposits, and erosion-surface veneers (from boulder gravel to silt-clay), associated with graded surfaces formed during at least three major episodes of valley entrenchment and partial back-filling. Pedogenic carbonate cements the uppermost part of the deposits, especially the older (higher) ones. As much as 66ft (20m) thick.
 - Qof** Older valley-fill, fluvial facies—River channel and floodplain deposits (sand to cobble gravel with lesser silt-clay), as much as 180ft (55m) above the modern river floodplain; unit interfingers with Qvo deposits; as much as 50ft (15m) thick.
- Intertonguing Qvo and Qyf**
- Qvo** Camp Rice Formation, upper piedmont-slope facies—Boulder to pebble conglomerate and gravel with stage IV pedogenic carbonate as much as 3ft (1m) thick at the top. Unit is 2-65ft (20m) or more thick near mountain fronts, thinning basinward.
 - Qof** Camp Rice Formation, undifferentiated—Cross sections only.
 - Qof** Camp Rice Formation, fluvial and associated facies—Light-gray, yellow, and pink to tan sand, sandstone, gravel, conglomerate, conglomeritic sandstone and mudstone representing fluvial channel and overbank deposits of the ancestral Rio Grande, as well as adjacent alluvial flat and eolian environments. Tongues of piedmont-slope conglomerate are interbedded locally with the unit. As much as 300ft (91m) thick.
 - Qof** Camp Rice Formation, piedmont-slope conglomerate—Well- to moderately-cemented, tan to reddish-brown, boulder to cobble-pebble conglomerate and conglomeritic sandstone derived from Red House Mountain and Sierra de las Uvas; intertongues with Qof downslope and is gradational upward into Qof upslope; unconformable with underlying formations. At least 150ft (46m) thick.
 - Qof** Camp Rice Formation, Qvg and Qfc undifferentiated—300ft (91m) or more thick.

- Tertiary**
- Trv** Rincon Valley Formation, conglomerate facies—Reddish-brown to tan conglomerate, conglomeritic sandstone, and mudstone; boulder- to cobble-sized clasts are predominantly Paleozoic limestone, sandstone, and siltstone adjacent to the Caballo Mountains and Tertiary volcanic rocks adjacent to the Sierra de las Uvas. Strata represent "early rift" alluvial fan deposits derived from ancestral Caballo Mountains as well as from uplifts east of the Sierra de las Uvas. Unit intertongues with Playa and alluvial-flat sediments, Trv. At least 2,000ft (610m) thick.
 - Trv** Rincon Valley Formation, siltstone-mudstone facies—Pale-red claystone, mudstone, and siltstone; gypsiferous over broad areas. Strata formed on alluvial flats or playans on "early rift" basin floors. Unit intertongues with or grades into Trvc. At least 2,000ft (610m) thick.
 - Thr** Hayner Ranch Formation—Dark-gray to tan conglomerate, conglomeritic sandstone, and mudstone containing mostly boulder- to cobble-sized clasts of Tu and Bell Top ash-flow tuff; unit unconformably overlies Thurman Formation or Uvas Basaltic Andesite, and is both conformable and unconformably overlain in different areas by Rincon Valley Formation. Strata represent "early rift" alluvial fans derived from ancestral Caballo uplift, as well as paleocanyon fill that was deposited on the hanging wall dip slope of the Rincon basin. At least 1,400ft (427m) thick.
 - Tt** Thurman Formation—White to light-tan to light-gray, parallel-bedded, tuffaceous sandstone and interbedded, pale-red to pale-tan mudstone; interpreted to be distal parts of alluvial aprons adjacent to rhyolitic volcanic center; unit intertongues downward with Uvas Basaltic Andesite. As much as 3,300ft (996m) thick.
 - Ta** Uvas Basaltic Andesite—Gray to black vesicular basaltic andesite flows containing at least two tongues of Thurman sandstone. Conformably overlain by Thurman Formation in footwall of West Rincon Hills fault but unconformably overlain by Hayner Ranch Formation in the Hatch uplift. Approximately 400ft (122m) thick.
 - Tbt** Bell Top Formation, undifferentiated—Cross sections only.
 - Tbt** Bell Top Formation, ash-flow tuff 7—Fine-grained, gray vitric ash-flow tuff; very discontinuous and local in distribution; Unit is 3-10ft (1-3m) thick.
 - Tbc** Bell Top Formation, conglomerate member—Reddish-brown to tan conglomerate, conglomeritic sandstone, and sandstone interbedded with white tuffaceous sandstone and pale-red mudstone; derived from Kneeling Nun Tuff and Palm Park Formation, as well as Love Ranch Formation; ash-flow Tbtts occurs near the middle of the unit. Shifting alluvial fan, basin floor, and distal volcanic piedmont-slope environments are represented. Approximately 425ft (130m) thick.
 - Tbs** Bell Top Formation, ash-flow tuff 6—Grayish-orange, crystal ash-flow tuff; moderately welded; interbedded with Tbc. Approximately 35ft (10m) thick.

- Tbc** Bell Top Formation, ash-flow tuff 5—Light-gray, moderately-welded, crystal-rich ash-flow tuff containing conspicuous white pumice lumps and dipyrnoidal quartz. Approximately 55ft (17m) thick.
 - Tpp** Palm Park Formation—Purple, gray, red, and green sandstone, mudstone, and labric breccia; upper 3/4 of the formation is exposed in Palm Park in hanging wall of Palm fault. At least 1,500ft (457m) thick.
 - Tr** Love Ranch Formation—Red and grayish-red conglomerate and conglomeratic sandstone containing abundant boulder- and cobble-sized clasts of Paleozoic limestone and Precambrian granite; only 20ft (6m) of formation is exposed in hanging wall of Palm fault.
- Permian**
- Ph** Paleozoic rocks, undifferentiated—Cross sections only.
 - Pa** Abo Formation—Red, cross-bedded sandstone and siltstone. Only 50ft (15m) exposed in hanging wall of the Palm fault.
- Pennsylvanian**
- P** Magdalena Group—Basal Red House Formation consists of basal white chert breccia, gray to green shale, thin- to medium-bedded limestone, and tan sandstone or quartzite, which grades up into medial Nakaye Formation. This unit includes medium- to thick-bedded, fossiliferous, burrowed, gray cherty limestone and interbedded shale conformably overlain by Bar B Formation. Thick shale units with interbedded, burrowed, fossiliferous limestone beds and limestone or chert pebble conglomerate comprise the Bar B. Exposed only in the footwall of the Palm fault (Red House Mountain). Approximately 910ft (277m) thick.
- Mississippian**
- M** Lake Valley Formation—Basal Alamo Member 3ft, (1m) thick is thin-bedded limestone and interbedded shale, followed by cliff-forming, cherty Alamo Member 20ft (6m) thick. Unconformably overlain by Red House Formation. Total thickness approximately 23ft (7m).
- Devonian**
- Db** Percha Shale—Greenish-gray to black micaceous shale in the lower part grading in the uppermost 32 ft (10 m) into brown micaceous siltstone. Maximum thickness is 236ft (72m) but varies considerably due to pre-Magdalena erosion.
- Silurian**
- gr** Fusselman Dolomite—Tan to gray, coarse-grained dolomite. Generally silicified and mineralized with fluorite and barite in only exposure in footwall of the Palm fault. At least 50ft (15m) thick.
- Precambrian**
- pc** Precambrian rocks, undifferentiated—Cross sections only.



- Explanation of Map Symbols**
- Geologic contact—solid where exposed or well-known, dashed where approximately known
 - Contact—approximate upslope limits of the Camp Rice fluvial deposits (Qfcd)
 - Normal fault—solid where exposed, dashed where approximately known, dotted where concealed, quartered where questionable, Bar-ball on downthrown side
 - Syncline hinges—showing direction of plunge. Solid where accurate, dashed where approximately known, dotted where buried
 - Anticlinal hinges—showing direction of plunge. Solid where accurate, dashed where approximately known, dotted where buried
 - Inclined bedding—Showing strike and dip
 - Gently inclined (between 0° and 30°) bedding, as determined remotely or from aerial photographs—Showing approximate strike and direction of dip
 - Inclined generic (origin not known or not specified) foliation—Showing strike and dip
 - Horizontal bedding
 - Erosional remnant of La Mesa surface, the constructional top of the Camp Rice fluvial deposits (Qfcd)
 - Location of geologic cross section

- Correlation of Map Units**
- Qyf, Qvo, Qof, Qvg, Qfc
 - Trv, Thr, Tt, Ta, Tbt, Tbc, Tbs
 - Ph, Pa
 - P, M
 - Db, gr
 - pc

Comments to Map Users

A geologic map displays information on the distribution, nature, orientation, and age relationships of rock and deposits and the occurrence of structural features. Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic quadrangle map may be based on any of the following: reconnaissance field geologic mapping, compilation of published and unpublished work, and photogeologic interpretation. Locations of contacts are not surveyed, but are plotted by interpretation of the position of a given contact onto a topographic base map; therefore, the accuracy of contact locations depends on the scale of mapping and the interpretation of the geologist(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. Site-specific conditions should be verified by detailed surface mapping or subsurface exploration. Topographic and cultural changes associated with recent development may not be shown.

Cross sections are constructed based upon the interpretations of the author made from geologic mapping and available geophysical and subsurface (drillhole) data. Cross-sections should be used as an aid to understanding the general geologic framework of the map area, and not be the sole source of information for use in locating or designing wells, buildings, roads, or other man-made structures.

The map has not been reviewed according to New Mexico Bureau of Geology and Mineral Resources standards. The contents of the report and map should not be considered final and complete until reviewed and published by the New Mexico Bureau of Geology and Mineral Resources. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the State of New Mexico, or the U.S. Government.